	No.	APV (cm/s)		CFR
		Baseline	Hyperemia	
Control	19	18 ± 7	61 ± 18	3.3 ± 0.6
Retinopathy (−)	8	29 ± 12*	69 ± 20	2.7 ± 0.6*
Retinopathy (+)	10	39 ± 11*#	72 ± 29	2.0 ± 0.4*#

Results are shown as mean ± sd (*p < 0.01 vs controls, #p < 0.01 vs pts without retinopathy)

Although maximal APV during hyperemia was not significantly different among these three groups, baseline APV in pts with diabetes was significantly higher than that in the controls. Furthermore, in pts with diabetes, baseline APV was significantly higher in pts with retinopathy compared with that in pts without retinopathy. As the results, CFR in pts with diabetes, especially in cases with retinopathy, was significantly lower than that in the controls.

Conclusions: Coronary flow reserve is significantly restricted in pts with diabetes, and this reduction of coronary flow reserve is more remarkable in cases with diabetic retinopathy.

992-59 Aortic Distensibility in Aortic Coarctation Using Intravascular Ultrasound (IVUS)

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We evaluated the Ao in 13 pts undergoing balloon dilation for coarctation (CoA) ranging in age from 1.5–17 yrs (4 pts were imaged both before and after balloon dilation) using 6F 20 MHz catheters (Aloka SSD550). IVUS determined thickness of the CoA shelf, smallest CoA internal diameter, cross-sectional area change during a cardiac cycle, and stiffness (pressure related area change) of the aortic segments were determined. IVUS data were averaged over three cardiac cycles and correlated with systolic and diastolic pressures above and below and the peak to peak pressure gradient through the CoA. IVUS imaging showed that the cyclical area change of the CoA segment was substantially less than that of the distal part of the descending Ao and much less than that of the Ao arch (CoA 17 ± 8.9% vs asc Ao 42 ± 12.7%, p < 0.001). Using pressure and dimensional expansion data calculated for pre-dilation data, stiffness of all segments, even of the proximal aorta ($\beta = 2.4 \pm 0.6$, $n = < 2$), was increased. There was, however, no significant relationship between the distensibility of the CoA, the smallest area of CoA, or thickness of the shelf and the pressure gradient, dilatability or presence of dissection after successful dilation (all p > 0.05). For all the pts, including the pre- and post-dilation data of the 4 pts subsequently dilated, the ratio of the smallest cross-sectional area of the CoA to that of the Ao arch in mid systole showed the most significant correlation with the pooled mean pressure gradients both before and after balloon dilation (r = 0.74, p < 0.01). In our study, IVUS facilitated evaluation of aortic wall structure and distensibility.

992-60 Popliteal Artery Ultrasound Examination (PAUSE)

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The popliteal artery (PA) is the most common site of aneurysm formation in the peripheral vasculature. When present it is a sinister harbinger of sudden catastrophe, as the incidence of thrombosis with distal embolization in asymptomatic patients approximates 25%. Confirmation by a non-invasive technique, conventionally duplex ultrasound (DUS), has traditionally been adopted to document the size of suspected aneurysm, although its accuracy has never been validated. The objective of this study was to compare the arterial diameters (D) as measured by DUS to intravascular ultrasound (IVUS) and quantitative angiography (QA). *Methods:* In 26 patients undergoing percutaneous revascularization (PR), the D of the popliteal arteries and distal superficial femoral arteries (SFA) were measured by DUS. During PR the D were measured at identical sites by IVUS and QA. *Results:*

	Diameter (mm)		
	DUS	IVUS	QA
PA	5.86 ± 1.30	5.21 ± 1.02(p = 0.11)	4.09 ± 1.02(p = < 0.05)
SFA (12 cm prox. PA)	6.27 ± 1.57	5.50 ± 1.09(p = 0.13)	4.32 ± 1.04(p = < 0.05)

In all 26 patients there was no statistical difference between diameters as measured by DUS as compared to IVUS in PA and SFA. However, there was statistical significance between DUS and QA. *Conclusion:* (1) DUS accurately measures PA and SFA diameters when compared to IVUS in normal vessels. (2) QA may underestimate the true diameters of arteries when compared with DUS and IVUS. (3) Therefore, DUS may be relied upon for the detection and follow-up of aneurysmal dilatation in the popliteal artery.

993 Altered Ventricular Function

Wednesday, March 27, 1996, 9:00 a.m.–11:00 a.m.
Orange County Convention Center, Hall E
Presentation Hour: 9:00 a.m.–10:00 a.m.

993-117 Role of Platelet Activating Factor and Tumor Necrosis Factor in Acute Endotoxemia-Induced Hypotension

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Current evidence suggests that the impaired cardiac function and cardiovascular depression associated with E. coli endotoxin (LPS) mediated endotoxemia results from release of tumor necrosis factor alpha (TNF) which then increases the release of platelet activating factor (PAF) from vascular endothelium. PAF, in turn, upregulates nitric oxide synthase (NOS) which then produces vasodilation, hypotension and shock. We tested this postulate. Five to seven Sprague Dawley rats (280–320 g) per group were given LPS (0.5 mg/kg, iv), PAF (150 ng/kg, iv) or TNF (3,000,000 U/kg, iv) 30 min after BN-50730 (80 μg/kg, iv) a mixed PAF antagonist or ethanol (2–4 g/kg, i.p.) which inhibits inducible NOS. Blood pressure (BP), heart rate (HR) and plasma reactive nitrogen intermediates (RNI) were measured at 30 min intervals for 2.5 hrs. Plasma TNF and PAF were sampled 90 min after PAF, TNF or LPS administration. PAF and LPS both produced hypotension. PAF did not increase plasma RNI or TNF and its vasodilation was abolished by BN-50730 but not alcohol. TNF failed to produce acute phase hypotension. LPS produced hypotension and increased plasma TNF and RNI which were inhibited by either BN50730 or ethanol. We conclude that LPS-induced cardiovascular depression is not mediated by PAF or TNF. Neither PAF or TNF are required for LPS-induced upregulation of NOS and NO-mediated hypotension. Finally, BN-50730 prevents LPS-induced cardio-depression by a PAF-independent mechanism.

993-118 Right Ventricular Function and Arterial Oxygen Tension Monitoring During Positive End-Expiratory Pressure Changes in Patients Undergoing Controlled Ventilation

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In patients with respiratory failure, mechanical ventilation may further impair right ventricular (RV) function. To identify the best value of positive end-expiratory pressure (best PEEP) in individual patient, i.e. the one with the best arterial oxygen tension (PaO_2) and the smallest cardiac effects (decrease of RV stroke volume), 10 pts admitted to our intensive care unit with severe respiratory failure were studied by echo. Systolic pulmonary artery pressure (PAP) estimated by transthoracic echo, was < 40 mmHg in 5 pts (Group A) and ≥ 40 mmHg in the others (Group B). Monitoring of RV kinesis was performed by TEE during stepwise PEEP increases from 0 to 20 cm H_2O. At each step RV stroke (RSV) and RV fractional area changes (RVFAC) were measured. PaO_2 was determined by arterial hemogasanalysis. RSV, RVFAC and PaO_2 at baseline (PEEP = 0 cm H_2O) were similar in the Group A and B, and did not change at PEEP 5 cm H_2O. At PEEP 10 cm H_2O, Group A showed, compared to basal, a significant increase (p < 0.05) of RSV (78 ± 6 vs 101 ± 13 ml), RVFAC (50 ± 4 vs 60 ± 3%) and PaO_2 (63 ± 13 vs 78 ± 13 mmHg). With a PEEP of 15 cm H_2O we found only a significant increase (p < 0.02) of PaO_2 (63 ± 13 vs 75 ± 14 mmHg), while PEEP at 20 cm H_2O a significant decrease (p < 0.02) of RSV (78 ± 6 vs 63 ± 12 ml) and RVFAC (50 ± 4 vs 32 ± 4%) was observed. Pts with pulmonary hypertension (Group B) did not show significant changes at 10 cm H_2O as compared to basal, but they had a significant reduction of RSV, RVFAC, PaO_2 at higher PEEP. Thus, monitoring of RV function by TEE Doppler during positive pressure ventilation seems to be a suitable and promising tool for identifying the optimal PEEP value for individual patients. In our study, mechanical ventilation with PEEP turned out quite favourable in patients without pulmonary hypertension, while it showed irrelevant or negative effects in patients with systolic PAP ≥ 40 mmHg.